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SOCIO-SPATIAL DEMOCRATIZATION OF PUBLIC POLICIES IN THE SEMI-ARID NORTHEAST: THE CASE OF CISTERNAS AND THE INTERIORIZATION OF TECHNICAL/HIGHTER EDUCATION - A GEOGRAPHIC AND EDUCATIONAL VIEW

DEMOCRATIZAÇÃO SOCIOESPACIAL DE POLÍTICAS PÚBLICAS NO SEMIÁRIDO NORDESTINO: O CASO DAS CISTERNAS E DA INTERIORIZAÇÃO DO ENSINO TÉCNICO/SUPERIOR- UM OLHAR GEOGRÁFICO E EDUCACIONAL

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ABSTRACT
In the Federative Unit of Ceará, whose phytogeographic constitution is predominantly caatinga vegetation and under a semi-arid climatic condition, the availability of surface water resources suitable for consumption is very restricted. Thus, the objective was to discuss the importance of public intervention in the development of these regions under sustainable and efficient measures. Our methodology was based on readings of bibliographical references and field observation in the rural communities of Crateús benefited by the cistern accessibility project. In this, the professor and public policies are one of the main agents in the execution and construction of such purposes, promoted in undergraduate and graduate vehicles, in higher education institutions, such as Universities and Federal Institutes (IF's), free, public and Of Quality.
Keywords: Development; semiarid; Cisterns; Universities and Federal Instit

RESUMO
Na Unidade Federativa do Ceará, cuja constituição fitogeográfica tem por predominância a vegetação de caatinga e está sob uma condição climática semiárida, apresenta disponibilidade de recursos hídricos superficiais apropriados ao consumo muito restrito. Objetivou-se, desta maneira, discutir a importância da intervenção pública no desenvolvimento destas regiões sob medidas sustentáveis e eficientes. A metodologia, baseou-se nas leituras de referências bibliográficas e na observação em campo nas comunidades rurais de Crateús beneficiadas pelo projeto de acessibilidade das cisternas. Nesta, o docente e as políticas públicas são alguns dos principais agentes na execução e construção de tais propósitos, promovidos nos veículos de graduação e pós-graduação, nas Instituições de Ensino Superior, bem como as Universidades e Institutos Federais (IF’s), gratuitos, públicos e de qualidade.

Palavras-chaves: Desenvolvimento; Semiárido; Cisternas; Universidades e Institutos Federais.

INTRODUCTION

The ongoing periods of drought affecting the Brazilian Northeastern Semi-Arid region in recent years are caused by anomalies and climatic dynamics intensified by geological, geomorphological, pedological characteristics, and anthropogenic actions that lead to a reduction in rainfall in the Brazilian Northeast. Associated with this is the transformation of the natural landscape into an artificial one, intensifying the effects of drought in the daily life of the Northeast region (Santana; Santos, 2020).

However, in this article, it is understood that the cause and causality of the drought in the mentioned spatial context are of multiple origins and factors. In this context and in this work, a single factor is not adopted as a reference, but rather the coalescence of various natural and non-natural agents. If previously there was a lack of investment and planning for the region's infrastructure to ensure socio-environmental and political-economic development, today this is already being seen as effective, with strong participation of public investments and subsequently with private capital (Machado; Dias; Silva, 2017).

The purpose is to guarantee access to water for the rural population in inland regions so that they do not migrate to urban centers with high demographic contingents and explicit infrastructure problems (lack of basic sanitation, treated water, garbage collection, noise pollution, water pollution, environmental pollution, among others) (Machado; Dias; Silva, 2017).

Nobrega (2004) clarifies that the rural population of Northeast Brazil consists of small and medium-sized farmers, mixed-race individuals, breeders of low-tech livestock, with low profitability, and highly vulnerable to climate characteristics (constant heat, low relative humidity, high luminosity, and low rainfall). Thus, it is important to highlight that the words of the author mentioned represent a deterministic reflection in which they establish a very close connection between traditional cultures, poverty, and rural areas.

Correlated with climate change, millions of people will be affected by more severe and prolonged droughts, affecting the daily lives of those who live in regions with socio-environmental fragility or aggravated by degradative practices, such as deforestation, wildfires, excessive plant and animal exploitation (Passador; Passador, 2010).

The objective of this work is to discuss the implementation of social public policies, such as plate cisterns in the Rural Zone of the municipality of Crateús, in the Brazilian Northeastern Semi-Arid, and the interiorization of Technical/Higher Education in the present century from a perspective that highlights the importance of the government in ensuring quality of life for the less privileged, assisting them with investments in structure and quality education.

The results, facing these socio-educational and economic measures, provide, in their own way, the fixation of the population in the semi-arid region, reducing the exodus to major capitals. Interventions are made through the qualification of the local population through Technical/Higher Education (which helps to retain the younger population in rural areas) and the material condition of having water for daily needs provided to small farmers (Guarrido, 1999; Soares, 2021; 2022).

MATERIALS AND METHODS

In order to achieve the study's objective, we conducted an extensive bibliographic review of renowned authors, authors, and institutions in the field through specialized scientific articles on the topic addressed. Among the references we relied on are: "Vulnerabilidade climática e recursos hídricos no Nordeste" (Cruz; Coimbra; Freitas,1999).

There is also "Combate à Seca e a Gestão dos Recursos Hídricos no Brasil" by Guarrido (1999) and "Articulação do Semiárido Brasileiro" (ASA, 2014), and other works related to public policies, about the Semi-Arid (Northeast), Cisterns, and Higher Education. Such works deal with practices and actions aimed at water accumulation, through strategies such as cisterns, artesian wells, or small reservoirs built underground, for example.

After the bibliographic reading, field visits were made to some localities in the municipality of Crateús (CE), located in the Microrregion of Crateús Sertões, near the Ibiapaba Mountain Range, or, as denominated by geomorphological criteria of Glint, da Ibiapaba, in the western part of the state 353.6 km from Fortaleza, the capital of Ceará, connected by BR-020.

The visits were observational in nature, observing the relationship of the residents of the communities of Quirino and Ipojuca, in the district of Poti, municipality of Crateús, with public policies, especially Cisterns and Higher Education. The decision not to conduct interviews is due to the encouragement of social distancing taking into account the COVID-19 pandemic (2020-2021). Therefore, the method of observation and bibliographic reading was chosen for the purpose of constituting this article (Fujita, 2007; Sousa; Oliveira; Alves, 2021).

HISTORICAL AND GEOGRAPHICAL CONTEXT

Faced with such deep dimensions in climatic and social aspects, one of the main challenges afflicting the Semiarid region is the effective water storage strategies aimed at addressing water deficits in this area. In this context, some strategies have been utilized and refined, amidst a disparity in the ways of coexisting with water.

On one hand, we have the Sertanejo, who daily employs cunning to obtain a bit of water for consumption, resorting to survival techniques. On the other hand, there are more elaborate techniques with a larger scale of water accumulation, namely, the most common and widely spread technology in the Northeast, the Damming process, also known as Damming. This technique involves damming or blocking the course of the river (Soares; Oliveira, 2021).

All of this allows for the accumulation of water during rainy periods to be used during droughts for population supply. In the first case, the strategies involve the excavation of small wells, called "cacimbas," aiming to withdraw cleaner and purer water for family consumption. These water sources are built near water bodies, namely, rivers, streams, and small to medium-sized reservoirs. Alternatively, clay cisterns could be built near their homes, collecting water from rainfall (Schistek, 1999).

Such infrastructure consisted of a large hole exposed to the open sky and covered with a cotton cloth, with the purpose of filtering out any materials that could compromise the quality of the water accumulated by the locals. After obtaining the necessary amount of water, this reservoir was closed with clay itself or with a mixture of clay and fibers

extracted from the Carnauba palm (Copernicia prunifera) in order to prevent loss to the environment through evaporation and infiltration (Schistek, 1999)

The social and historical context of the Semiarid region is marked by its relevance and decadence (Soares, 2023). In contrast, there is a select group of individuals whose income conditions were more consolidated, such as traditional families, the Catholic clergy, merchants, and landowners, enriched by aids directed specifically to these specific groups, or by assistance policies diverted by them, whose promotion was their own satisfaction, initiated in the First Republic (1889-1930) and intensified during the military governments (1964-1985) (Neves, 1998).

In these situations, in order to overcome the drought, more elaborate constructions were carried out, such as large-capacity cement cisterns for accumulation, or resources were raised for the construction of large dams, known as large-scale Barramentos, or even for drilling artesian wells on their properties. Such measures were created to generate employment for the poor and desolate masses during droughts, dynamizing the economy as a whole in the northeastern interior, providing water for the benefit of individuals near the hydraulic works.

However, many of these landowners, even with the consent and resources from public execution, prohibited the use of water and activities that could be developed with its use, from fishing to horticulture, for example, often repressing with intimidation or repression through the use of firearms.

These merchants, landowners, and members of the clergy, in the vast majority, resided in urban centers, which had a more accessible and organized structural support (high educational level, professional positions with adequate remuneration, and access to suitable and quality services).

In the vast majority of cases, a plausible and common alternative method in small municipalities in the Northeast (NE) was the digging of "cacimbões" in the backyards of houses (or near rivers in urban areas) where they lived. The excavation of "cacimbões" occurred due to the characteristic that many urban centers were built in proximity to rivers. Due to this condition, there was an increase in soil infiltration during rainy periods, thus recharging their water table, allowing water to be found at shallow depths with the excavations.

Corroborating with the explanation by Cruz, Coimbra, Freitas (1999), in the northeastern sertão region, water scarcity is one of the major obstacles to the survival of agriculture and livestock professionals (farmers, cattle, swine, poultry, sheep, and goat breeders). The fragility is evident in the context of constant climatic instabilities observed in years when the drought phenomenon is actively felt, often exacerbated by inadequately implemented political interventions.

Since colonial times, there have been records of prolonged drought seasons in the Northeast, particularly in the Semiarid region, with these periods being responsible for the deaths of millions of people and also causing a drastic reduction in food production by small and medium-scale farmers, along with almost nonexistent assistance from the government, failing to provide infrastructure projects that could alleviate these socio-political and economic problems.

Even with the State's intervention for over a century, policies designed for the semiarid region over time, implemented through the establishment of institutions such as the

Department of National Works to Combat Drought (DNOCS) or the Superintendence for the Development of the Northeast (Sudene), have not effectively implemented policies to reduce the impacts of drought in an effective and lasting manner (Cruz, Coimbra, Freitas, 1999; Oliveira, 1987).

However, this situation showed signs of change with a historical moment that coincided with the end of the civil-military dictatorship and the rise of more popular, non-elitist political groups. It was sought to implement, with the 1988 Constitution (considered the most citizen-oriented constitution in Brazilian history), that the State should direct its investments towards addressing the social vulnerabilities explicitly present in the country.

As an example and symbol of this discourse, the Northeast Region converged with the drought crisis that affected the sertanejo population in the 1990s, prompting government authorities to initiate a series of measures to reverse this disaster that directly affected the region's agricultural sector.

According to Cruz, Coimbra, Freitas (1999), the droughts following the 1950s led to a decrease in regional agricultural activities, retracting at least 4.5% of the Gross Domestic Product (GDP). Approximately 12 million people were affected in economic, cultural, social, educational, and agricultural contexts (Cruz, Coimbra, Freitas, 1999; Oliveira, 1987).

With the Redemocratization (1985 to the present day), also known as the Post-Dictatorship Period, governments began to introduce techniques that aligned with socio-environmental policies and practices established by the Stockholm Conferences (1972) and Rio 1992 (large-scale international events focused on environmental issues and climate change). In the case of the Semiarid region, this regional focus was favored by the implementation, already in the late 1990s, of the introduction and dissemination of Semi-Arid Coexistence Practices (Paz; Teodoro; Mendonça, 2000; Centelhas, 2019).

De Souza et al. (2017) define Semi-Arid Coexistence Technologies as social, economic, and cultural forms and/or strategies to be applied in the interaction with communities, aimed at solutions that transform social, environmental, economic, and local reality.

From these established perspectives, there was an investment in Semiarid coexistence technologies and Social Programs to break the so-called Poverty Cycle (so named due to the lack of development measures that broke the succession of misery and poverty in the Northeast), starting with the existing Rural Retirement Fund, later renamed Rural Worker Retirement; Social Assistance Programs for men and women in rural areas; Bolsa Escola, during Fernando Henrique Cardoso's government (1994-2002), by the Brazilian Social Democratic Party (PSDB), and reconfigured by President Luiz Inácio Lula da Silva (2003-2010), by the Workers' Party (PT), as Bolsa Família.

It is worth adding to this context the Semi-Arid Articulation (ASA), under which a series of entities gathered to develop and disseminate social coexistence technologies in the Semiarid, such as Agroforestry Systems, drilling of artesian wells, the Plaque Cistern System - P1MC, transformed during President Dilma Rousseff's government (2011-2016) into the One Land and Two Waters Program (P1+2), when it was expanded and modified to Polyethylene Cisterns, as their costs were lower and they were easier to handle, along with another policy known as the Water for All Program (Gnadlinger; Silva; Brito, 2007; Brito et al., 2009; Assis, 2012; Santos; Ceballos; Sousa, 2013; Santos; Borja, 2020).

The social technologies and policies (P1MC and P1+2) served as watershed moments in improving the quality of life for those living in the Sertão regions, ensuring access to water and food production during periods of drought. These measures are essential for keeping young people and families in rural areas of the Caatinga, aiming to prevent further swelling of urban centers and exacerbating their socio-spatial woes (Gnadlinger; Silva; Brito, 2007; Brito et al., 2009; Assis, 2012; Santos; Ceballos; Sousa, 2013; Santos; Borja, 2020).

When comparing previous droughts like those in the 1990s to those occurring from 2012 to 2018, one can see how these measures have improved the lives of people in the Sertão, preventing intense migrations as seen in the decades from the 1930s to the 1990s. There has been a return to the Brazilian semiarid, an increase in the economy and per capita income of families in the Northeast, as well as a reduction in poverty and hunger (though they still exist in the region).

According to Falcão and Costa (2014), based on the Brazilian Institute of Geography and Statistics (IBGE), in 2010, at least 11.43 million people lived with an average per capita income ranging from R$1.00 to R$70.00, and another 6.8 million had no income (Passador; Passador, 2010; Trovão; Araújo, 2019; Leão; Lima, 2019).

Passador and Passador (2010) argue that the implementation of programs like P1MC and P1+2 was of undeniable importance in the economic and financial improvements of families covered by these policies. According to the authors, more than 250 thousand cisterns were built, and around 300 thousand families were served in almost all municipalities of the Northeast Semiarid region, employing about 5,000 masons until 2009.

It's worth mentioning the positive effects such as: increased income for families, dedication to domestic and employment work, reduction of fatigue and physical efforts caused by the search for water over long distances for consumption, dedication to commercial, agricultural, and livestock activities, or even the reduction of costs for families in paying for water trucks throughout the year. Thus, the improvements achieved resulted from rural families' access to water, promoted by the availability of public policies aimed at sustainable socioeconomic development (Passador; Passador, 2010; Falcão; Costa, 2014; Trovão; Araújo, 2019; Leão; Lima, 2019).

Regarding the improvements in Northeast Brazil, it is possible to point out the interiorization of the Federal Public Education Network to regions far from state capitals, with clear examples being Federal Institutes, State, and Federal Universities across all nine states of the federation, mainly in medium-sized cities, providing access to quality education that previous generations did not have access to (Passador; Passador, 2010).

Many social historians argue numerous reasons regarding the factors that led to the configurations of neglect by public officials aligned with state power, aiming to understand the obstacles to Northeast development after the decline of sugarcane in the sixteenth century as a flourishing economic center.

Prado Jr. (1977) and Furtado (1980) converge that among the most relevant reasons are the recurrent monetary concentration by dominant elite groups, inequality of per capita income, accumulation of people in unproductive sectors, application of low-level cutting-edge technologies, and the lack of interest by the government in reversing the current situations (Prado Jr, 1977; Furtado, 1980).

In an attempt to reverse and in detriment of the worsening of social and economic circumstances, the Monarchical Government, during its Second Reign (1840-1889), already with D. Pedro II, provided incentives through infrastructure works, such as the Açude do Cedro (1890 to 1906), in the state of Ceará. With the establishment of the Proclaimed Republican Government, more institutionalized and technical measures were adopted.

According to Garrido (1999), the DNOCS was of paramount importance in consolidating the objectives of constructing water works in the Northeast, from creating drought combat strategies to water accumulation through the creation of reservoirs in collaboration with other institutions, such as the São Francisco Valley Commission (CVSF), the Banco do Nordeste do Brasil (BNB), and Sudene. Nonetheless, problems of hunger and poverty still haunted the reality of the most socioeconomically fragile families (Garrido, 1999; Paz; Teodoro; Mendonça, 2000; Falcão; Costa, 2014).

Even with dense and concentrated investments in the semiarid region, they failed to break the cycle of hunger and poverty portrayed in the media, where the region was merely depicted as a place of starving families and socioenvironmental problems that led to the image of the thin poor and the mother fetching water with a high sediment content, giving it a reddish (muddy) character, over long distances to satisfy the basic needs of their family.

In light of this perspective, it is extremely necessary to reflect that resolution actions, both through damming and through welfare programs, fell victim to corruption, financial resource diversions for personal use and cost, by politicians, businessmen, and public servants who did not intend to consciously use the investments made there, with the purpose of regional and national development (Menezes, 1937; Miranda, 2002; Gnadlinder; Silva; Brito, 2007; Brito et al., 2009; Assis, 2012; Santos; Ceballos, 2013; Santos; Borja, 2020).

ACCESS TO WATER IN THE SEMI-ARID

The quantity of good-quality water available in nature is finite, and its availability is gradually decreasing due to population growth, agricultural expansion, and environmental degradation (MEDEIROS, et al. 2003). Water does not accumulate in the soil year-round in most of the Semiarid Polygon due to climatic and soil conditions. This defines one of the region's main characteristics: water deficit, meaning the potential evapotranspiration loss exceeds the available water in the environment for most months of the year. This situation leads to the occurrence of intermittent and low-flow rivers in most parts of the region.

Similarly, due to geological and lithological characteristics, extensive storage in porous rocks (aquifers) does not occur in the crystalline part of the semiarid region, but only accumulation in fissures of crystalline rocks, with low flow and more susceptible to salinization. Thus, in most of the Northeastern semiarid, water is a limiting factor for life, both ecologically in general and for human societies (Paz; Teodoro; Mendonça, 2000; Sobrinho, 2016).

There is a lack of public policies, social initiatives, and infrastructure to meet long-term water needs in this region, such as the distribution of financial and technological resources,

among other strategies, aimed at reversing this socio-environmental vulnerability, through the Social Mobilization and Training Program for Coping with the Semiarid: One Million Rural Cisterns Program (P1MC) linked to the government's Zero Hunger program, institutionalized under the responsibility of the Ministry of Social Development and Fight against Hunger (MDS) (Brazil, 2008; 2009; 2011 Sobrinho, 2015; 2016).

In this context, access to water is legally recognized in Brazil as an essential right because this resource is defined by the 1988 constitution as a common good of the people and essential to a healthy quality of life. The World Health Organization (2001) emphasizes that everyone, at any stage of development and socioeconomic condition, has the right to adequate water supply. In this context, the right and access to the fundamental liquid for life's existence become an important public policy for development and poverty alleviation, present in a long-standing cycle in the Northeast.

According to Xavier (2010), "limited access to good-quality water in sufficient quantity leads to increased poverty, diseases, and hunger, problems that could be alleviated with efficient water supply that meets potability standards." In developing countries, poor sanitation conditions are the main cause of outbreaks and epidemics of waterborne diseases, which account for more than half of hospital admissions in Brazil and half of deaths in children under one year of age (Zancul, 2006; Falcao Sobrinho et al. 2015).

In this context, a series of measures aimed at reversing these disparities have attempted to make this water available with basic objectives at two points: the first, ensuring access to quality consumption for rural populations and animals, thereby increasing productivity; the second point, still very little encouraged: the attempt to reduce epidemic cases among these vulnerable and underserved populations by public authorities, through the provision of basic sanitation.

One of the alternatives found, in addition to damming, characterized as a sustainable and efficient solution for families that incorporate the criteria for government policies, was the use of cisterns, resulting in a duality in the materials used: those built with polyethylene and those made of plate, constructed of masonry (technique involving reinforcement bars and cement). Intended solely for human consumption, built for the purpose of collecting rainwater and having three fundamental structures: the 'collection area' (roof or paved area); 'conduction subsystem' (gutters and ducts) and 'reservoir' (cistern) (Filho et al., 2005; Kuster et al., 2006).

In the implementation of cisterns, the ASAS proposal (2014) aimed to directly reduce water needs in rural families and communities, mobilizing, along with the P1MC, in 2001, the encouragement and dissemination of the construction of plate cisterns throughout the entire Semi-Arid Northeast (ASAS, 2014; Gomes; Heller, 2005).

Despite the almost non-existent investment in basic sanitation, especially in the collection and treatment of wastewater, the implementation of cisterns made it possible to reduce the contamination of infectious diseases caused by viruses, bacteria, and parasites, common in rural and urban areas, including: diarrhea, Zika, dengue, and leptospirosis, for example. Another implemented factor was the understanding and knowledge of the quality of the consumed water, i.e., potability, following aspects such as taste, color, turbidity, the presence of inappropriate chemicals, concentrations of unwanted materials, pathogenic microorganisms causing diseases, along with other water quality criteria (Neto, 2014).

THE INTERNALIZATION OF TECHNICAL/TECHNOLOGICAL AND HIGHER EDUCATION AND THE IMPROVEMENT OF BASIC EDUCATION IN THE NORTHEASTERN INTERIOR OF BRAZIL.

The process leading to the penetration of University Campuses and Federal Institutes occurred more prominently in the 2000s, at the beginning of the Lula government (2003-2010), especially with Law 11.892 (2008), which created the Federal Institutes (IFs), included in the program of the Federal Network of Higher Education (RFES), aimed at more applied research.

The second program, called the Network of Professional, Scientific, and Technological Education (EPCT), had its fundamental expansion in improving the indicators of Basic Education development, aiming to raise educational indices in areas that are more deprived and with socially, economically, and educationally lagged conditions (Freire; Holanda, 2016).

Furthermore, the implementation of this educational policy directly influenced other dimensions, such as Geographic, Social, and Development. The objectives of this policy are the expansion, enlargement, internalization, and consolidation of Higher Education Institutions (HEIs), aimed at democratizing access to Technical, Technological, and Higher Education. This policy aims to qualify professionals in the hinterland regions, avoiding migration and stimulating regional development by retaining these people. The enhancement of the social function and commitment enabled the beginning of overcoming poverty and reducing social and territorial inequalities (Holanda; Silva, 2018; Gomes; Heller, 2005).

Still in this context, the program addressed the three dimensions mentioned earlier, establishing criteria for the implementation of University Campuses and IF Campuses. The main criteria were directed at populous municipalities with low per capita income, or extreme poverty, favorable geographic dimensions, without the presence of State and Federal Institutions of educational relevance, and finally, municipalities with low investment indices in development (Brazil, 2008; 2009; 2011).

A large part of Brazilian municipalities with poor social and economic conditions is in the Northeast. This policy was more significant in municipalities in this region, with Ceará being the state that most internalized IFs in its territory, especially in regional hub municipalities, whose development and population growth configuration require infrastructure for the growth of the state's microregions

OTHER SOCIAL ASSISTANCE PROGRAMS, IMPROVEMENT OF PUBLIC SERVICES, AND THE SUSTAINABILITY OF FAMILIES IN THE SEMI-ARID REGION

Public policies for coexistence with the semi-arid region have a historical context associated with droughts, water crises, and social inequality present in this territory. From this, the Brazilian state aims to approach the specificities of the semi-arid region and, through public policies, provide the population with means to coexist with the context at hand. For this, we highlight the implementation of cisterns, which provide access to water during the dry season, promoting the permanence of the population in the semi-arid region.

Another important aspect was the internalization of education through the expansion of Universities and Federal Institutes, which provided the children of farmers access to higher/technical education. It is important to emphasize the improvement in the teacher training process, which through initial and ongoing training programs, provide teachers with better conditions for professional practice (Silva; Brandão; Dalt, 2009; Silva, 2007; Machado; Dias; Silva, 2017; Soares, 2022).

Within complementary categories, there are also other essential and indisputable factors in the success of assistance policies for small family farmers in the rural areas of the semi-arid region. It is worth mentioning the improvements in public education networks in this region and the incentive programs common to low-income families, such as Bolsa Família and the Program for Strengthening Family Agriculture (Pronaf), which helped improve the quality of life and provided young people and children with the opportunity to go to school, aiming to break the successive cycles of poverty within northeastern family nuclei.

The implementation of policies targeted at farmers ensured the reimbursement of losses and/or damages linked to the values presented by this class, stipulated by the criteria and resources available from the state. Thus, favorable to both situations, both for parents who need to generate income and for children who need to go to school (Silva; Brandão; Dalt, 2009; Silva, 2007; Machado; Dias; Silva, 2017; Soares, 2022; Passador; Passador, 2010; Trovão; Araújo, 2019; Leão; Lima, 2019).

The implementation of social and educational policies benefited both parents and students (and their children, workers, small traders, among others). The internalization of Technical and Higher Education along with other policies was created and implemented with the purpose of promoting regional development and providing some income to students through important programs such as PIBID and PRP.

Relevant institutionalized programs (also in line with the Federal Government) that combine efforts with schools in municipal and state education networks are the Institutional Teaching Initiation Scholarship Program (PIBID notice no. 07/2018-2020) and the Program Pedagogical Residency (PRP notice nº 01/2020-2022) [1],, both lasting 18 months and the payment of scholarships worth 400 reais to students.

The significant functionality of the implementation proposal contributed to a closer relationship between schools and universities, promoting an exchange of knowledge and expertise, and providing already graduated teachers and supervisors of scholarship holders with the opportunity for continued education beyond what the State offers. The PIBID and PRP bring with them significant and innovative experiences to schools, whose structural characteristics are precarious, and the student body predominantly comes from socioeconomically humble and disadvantaged backgrounds when compared to the few privileged students in private schools (Soares, 2021; 2022).

The privilege of being a PIBID and PRP scholarship holder ranges from the possibility of theoretical and practical experience to a more holistic view of the harsh reality of teachers in basic education and their difficulties in the profession. However, when it comes to providing dignified conditions to humble rural farmers in the Northeast, being a PIBID

[1] Notice of duration of the Institutional Teaching Initiation Scholarship Program (PIBID) and the Capes Pedagogical Residency Program (PRP) between the years 2018-2020 and 2020-2022, respectively.

scholar and resident provides assistance in educating and raising awareness among young people (future adults) in Brazil, among other reflections, about the importance of preserving and conserving the environment. The goal: to ensure privileges for the descendants of those who are here to have water, food, and a home to call their own, mine, and ours (Soares, 2021; 2022).

RESULTS AND DISCUSSION

The execution of this work is characterized by theoretical and conceptual discussions directed towards the geographical dimension with the purpose of analyzing the relevance of public policies that have empowered the less privileged layers, aligning with sustainable and socio-educational development in the heterogeneous semi-arid region. Cities, agribusiness cultivation areas, rural communities with groundwater availability via fissure aquifers are agents that are part of this spatial framework.

Based on observations conditioned by visits to rural communities, where the Plate and Polyethylene Cistern Program were implemented to ensure the supply of drinking water throughout the year, for example, in the Quirino and Ipojuca communities in the Poti district, in the municipality of Crateús - CE, we have seen that such localities have experienced a reduction in the number of individuals who used to migrate vigorously to large urban centers, such as São Paulo and Rio de Janeiro. Those who reside there are either continuing to reside in their interiors or engaging in pendular migration between the countryside and the city (Crateús - microregional hub) daily.

Upon deeper analysis, we noticed that when comparing the daily life and the level of quality of life present in past decades, the situation reported was much more difficult, caused by the lack of infrastructure for storing large quantities of water, intended to meet the population's needs, thus making it impossible to sustain subsistence production for small and medium workers.

Cisterns and other technologies for coexistence with the Northeastern Semi-Arid region enabled the production of Productive Backyards by rural families throughout the year, ensuring their subsistence and income for the family during the dry season when it is not in the seasonality of corn, beans, and other species for personal and daily consumption (Brito, 2017).

Improvements in educational indices contributed to the reduction in migrations due to the increase in policies stimulating the development of medium-sized cities, enabling improvements in the quality of life of the most underprivileged populations. In the words of Holanda (2011), this dynamic in the semi-arid region conditioned not only the reduction in migration but also the dynamization of the interior of this framework, favoring the expansion of investments and economic, social, cultural, and commercial development of many cities throughout the 21st century. With access to water, families had the opportunity to provide their children with quality education and, thus, interrupt the Cycle of Poverty in the Northeast (Silva; Brandão; Dalt, 2009).

With this, based on the investigations made through successive bibliographic readings and field observations, we perceive the fundamental changes that public investments have brought about in the structuring of the Semi-Arid regions of Northeast Brazil. Particularly, the programs aimed at water supply, small-scale food production, and the permanence of young people and adults in their respective areas have avoided rural exodus and inter-regional and national migrations to large urban centers, which today face a high deficit of infrastructure.

The discourse of combating drought, which is closely related to traditionalism, based on a fragmented and mechanistic view, advocates distancing and alienation between humans and nature. Individuals, therefore, act in a predatory manner, seeking economic growth and consumer satisfaction.

In this perspective, natural adversities are fought against so that humans have control and can fully carry out activities. Thus, water scarcity should be addressed with water solutions, low productivity with technologies, modernization of properties, among others.

However, it was realized that blaming nature is simply an ideological device used to cover up structural issues causing poverty, such as land concentration, wealth, and power, which, combined with labor exploitation and misuse of public resources in the past, were factors that caused poverty.

Living with the semi-arid region is directly related to the paradigm based on an ecological development vision, breaking with traditionalism, and providing reconciliation between humans and nature. Consequently, this context is based on sustainable development which, through the valorization of knowledge and practices appropriate to the environment, enables the articulation of government initiatives, such as cisterns, aimed at improving the quality of life of local populations.

Therefore, the relationship perceived in this work between Higher Education, Cisterns, and the Semi-Arid region was that just as without water there is no life, without guarantees of access to it and its use by the people, this group also does not develop fully.

By enabling access to water and extending other coexistence policies with the semi-arid region, the foundation of development in the region was consolidated, something long-awaited over its 500 years of occupation and exploitation.

In this context, basic education, as well as higher education, and the support of public policies for staying in educational programs (both basic, like Bolsa Família, and higher, like student aid scholarships and programs like PIBID and PRP) function as arms of this network of coexistence programs with the semi-arid region, as they have enabled and continue to enable the full development of the Northeast in a sustainable, economic, cultural, social, political, environmental, geographical, and educational manner.

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